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ASSIGNMENT BOOKLET

SCN3230 Biology 30

Module 2 Assignment

FOR STUDENT USE ONLY

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Biology 30

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we engage

The Endocrine System Module 2

Assignment Booklet



Calgary Board of Education

Alberta
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FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	25	
Lesson 2 Assignment	35	
Lesson 3 Assignment	29	
Lesson 4 Assignment	20	
Lesson 5 Assignment	20	
Lesson 6 Assignment	15	

Teacher's Comments

Biology 30
Module 2: The Endocrine System
Assignment Booklet
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Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	



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- Tools4Teachers, <http://www.tools4teachers.ca>

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(25 marks)

MODULE 2: LESSON 1 ASSIGNMENT

This Module 2: Lesson 1 Assignment is worth 25 marks. The value of each assignment and each question is stated in the left margin.

Lesson 1 Assignment—Structure and Organization of the Endocrine System

(15 marks)

Lab 1—Student Stress**Procedure**

(2 marks)

1. Record your data in the data table below.

	Blood Pressure	Pulse
Reading 1		
Reading 2		
Reading 3		
Reading 4		

Analysis

(2 marks)

2. Did the pulse and blood pressure change while taking the test? If so, how? How long did it take for the subject's pulse and blood pressure to return to the resting values?

(2 marks)

3. In addition to pulse and blood pressure, list at least two other physiological changes that may have occurred in the subject while writing the stress test.

- (2 marks)** 4. How would the physiological changes that you identified in question 3 be useful responses to a life-threatening situation?

- (4 marks)** 5. List six or more stressful situations that people in modern societies may experience. Which of these are truly dangerous? Which, if any, might be considered positive?

(10 marks) Reflect and Connect

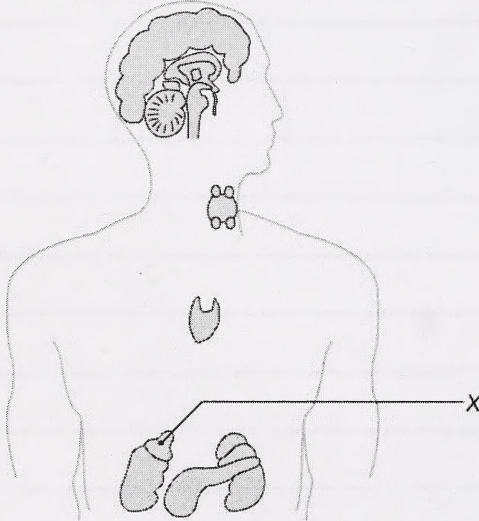
For each question below, choose the correct answer and write a statement indicating why it is correct.

- (1 mark)** 7. Damage to which of the following endocrine glands would most affect the reaction of the body to an emergency that stimulates the sympathetic nervous system?

- A. thyroid gland
- B. adrenal gland
- C. anterior pituitary gland
- D. posterior pituitary gland

- (1 mark)** 8. Which of the following hormones is secreted by the gland indicated by X in the diagram below?

- A. cortisol
- B. glucagon
- C. calcitonin
- D. antidiuretic hormone



- (1 mark)** 9. Growth of the long bones and the skeleton is promoted by a hormone secreted by the

- A. adrenal cortex
- B. adrenal medulla
- C. anterior pituitary gland
- D. posterior pituitary gland

(1 mark) 10. Increasing the levels of aldosterone in blood would result in

- A. increased blood volume
- B. decreased blood pressure
- C. increased urine production
- D. less reabsorption of water

(1 mark) 11. Which of the following rows correctly matches the endocrine gland to the hormone it secretes and the effect/response of the hormone?

Row	Endocrine Gland	Hormone Secreted	Effect
A.	posterior pituitary	ADH	increases water absorption
B.	adrenal cortex	epinephrine	fight or flight
C.	pancreas	insulin	raises blood glucose
D.	anterior pituitary	oxytocin	initiates childbirth

(1 mark) 12. Which of the following is an example of a tropic hormone?

- A. cortisol
- B. insulin
- C. thyroid stimulating hormone
- D. antidiuretic hormone

(1 mark) 13. Which pair consists of antagonistic hormones?

- A. TSH and thyroxine
- B. cortisol and epinephrine
- C. calcitonin and parathormone
- D. ACTH and cortisol

(1 mark) 14. Which of the following statements is true?

- A. Exocrine glands secrete chemical messengers called hormones directly into the bloodstream, which transports the hormones throughout the body.
- B. Compared to the actions of the nervous system, the hormones of the endocrine system have faster and longer-acting effects on a broader range of cell types.
- C. The concentration of hormones in the blood remains constant to maintain homeostasis.
- D. When a hormone binds to its receptor, it triggers other reactions in the target cell.

- (1 mark) 15. Parathyroid hormone acts to ensure that
- A. calcium levels in the blood never drop too low
 - B. sodium levels in urine are constant
 - C. potassium levels in the blood don't drop too low
 - D. the concentration of water in the blood is sufficient
- (1 mark) 16. Which hormone stimulates the adrenal cortex to produce several of its hormones?
- A. TSH
 - B. releasing hormone from the hypothalamus
 - C. adrenocorticotrophic hormone
 - D. ADH

MODULE 2: LESSON 2 ASSIGNMENT

This Module 2: Lesson 2 Assignment is worth 35 marks. The value of each question is stated in the left margin.

Lesson 2 Assignment—Who Is in Charge?

Thought Lab: Evaluating Potential Uses for Human Growth Hormone

For questions 1 to 4, read each question carefully. Place your answer in the spaces provided.

Suppose Health Canada is re-evaluating its regulations for the use of synthetic hGH and is asking for input on the matter. There are several issues to be considered before re-evaluation can be effective.

Issue 1

Until recently, the use of synthetic hGH was approved only for those children who had malfunctioning pituitary glands and could not produce adequate amounts of the hormone themselves. Recently, the use of synthetic hGH has been approved for children who are genetically of short stature. Should people have the option to take synthetic hGH just to increase their genetically predetermined height?

Issue 2

The production of natural hGH declines with age. This makes it increasingly difficult to reduce one's body fat as one ages. Given that obesity has reached epidemic levels in the North American population, and one of the functions of hGH in the body is to reduce cellular fat, should synthetic hGH be approved as a diet treatment for obesity?

Issue 3

Because one of the functions of hGH in the body is to build lean muscle mass, its use has become widespread among various athletes. In fact, many athletes at the 1996 summer Olympic Games in Atlanta, Georgia, referred to the event as the "hGH Games." Despite its expense, many athletes, from baseball players to weightlifters, are acquiring synthetic hGH because it is difficult for drug testers to detect. Should competitive athletes be allowed legal access to synthetic hGH?

You will address **one** of these issues. Further research using library or Internet resources is recommended.

(10 marks)

1. Write a list of questions that you think should be addressed before Health Canada takes action on the issue you have chosen. Your questions should address basic information about hGH, research findings, long-term effects of hGH, ethical and safety concerns, and specific guidelines for any new regulations.

[illegible]

(5 marks)

2. Suppose you are attending a forum on hGH use held by Health Canada. You have 5 minutes to present the list of questions that you made in Step 1 to the delegates (your classmates on the discussion board) in a convincing manner. You may use visual aids, such as computer-generated slides, overheads, or a poster, to present your questions effectively. You will have an opportunity to discuss questions from other students who have also posted presentations of questions.

Attach your response to this Assignment Booklet or otherwise submit it to your teacher. Read or view the presentations of your classmates before completing the next set of questions.

- (2 marks)** 3. a. What are the main questions that Health Canada should investigate before changing its regulations for the use of synthetic hGH?

- (2 marks)** b. Why might parents want synthetic hGH for their children? What should parents be aware of before deciding to obtain hGH for their children?

- (2 marks)** c. Should athletes be allowed to use synthetic hGH? Why or why not?

- (2 marks)** d. Should health insurance cover the use of synthetic hGH and, if so, in which circumstances?

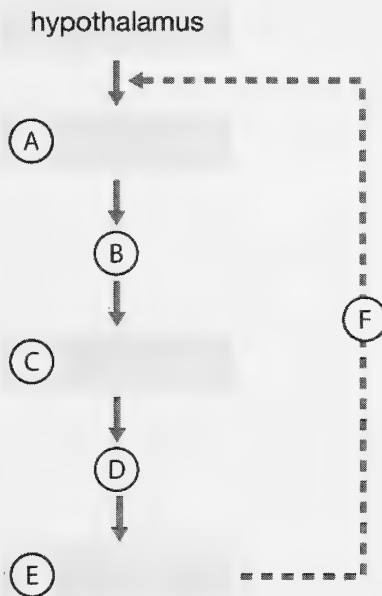
- (12 marks)** 4. Create a table to record the major societal risks and benefits of approving the use of synthetic hGH in the three issues discussed in the forum.

MODULE 2: LESSON 3 ASSIGNMENT

This Module 2: Lesson 3 Assignment is worth 29 marks. The value of each assignment and each question is stated in the left margin.

(29 marks) **Lesson 3 Assignment—the Adrenal Gland**

- (15 marks)** 1. Use this flow chart to answer the following questions.



- (1 mark)** a. Identify the letter on the flow chart that represents the pituitary gland.

- (2 marks)** b. Identify the name of the hormone that is released from the pituitary gland and the letter on the flow chart that represents it.

- (2 marks)** c. Identify the endocrine gland that is targeted by this pathway and identify which letter on the flow chart represents this gland.

- (2 marks)** d. As a result of this regulatory pathway, identify two hormones that are released from this endocrine gland.

(4 marks)

- e. Describe the effects of these two hormones on the body systems and tissues.

(4 marks)

- f. Explain how the production of these hormones is regulated.

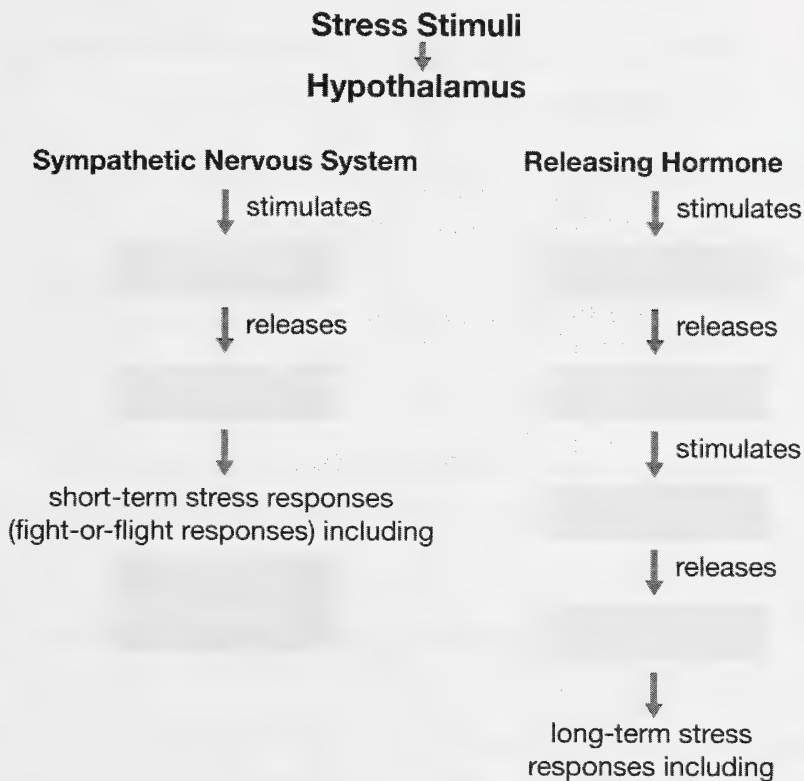
- (6 marks) 2. Complete **one** of the following two choices.

Choice 1: Distinguish between the structure and function of the adrenal medulla and the adrenal cortex by completing the table below.

Characteristics	Adrenal Medulla	Adrenal Cortex
Location in Gland		
Composition of Cells in Gland		
Hormones Secreted		
Effects of Secreted Hormones		
Duration of Effect		
Stimulated By		

Choice 2: Draw a Venn diagram that compares the structure and function of the adrenal medulla and adrenal cortex.

- (8 marks) 3. Complete the following flow chart that outlines both the short- and long-term stress responses.



MODULE 2: LESSON 4 ASSIGNMENT

This Module 2: Lesson 4 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 marks) Lesson 4 Assignment—the Thyroid and Parathyroid Glands

Closed Written Response

Use the information below to answer the following questions.

George’s family was very concerned about his health. George was lethargic and just wanted to sleep all the time. He was losing clumps of hair and his skin and nails were becoming dry and brittle. His family noticed an ever-enlarging growth on his neck. George consulted his family doctor, who determined that George’s symptoms were related to a malfunctioning thyroid gland.

The following questions are based on the doctor’s investigation of George’s symptoms.

- (2 marks)

1. a. Identify the hormones produced by the thyroid gland.
- (1 mark)

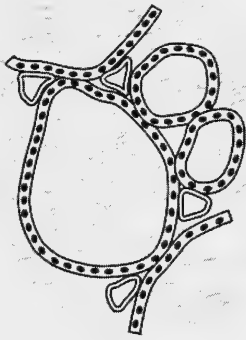
b. Based on George’s symptoms, the doctor identified the hormone most likely responsible for his condition. Identify the hormone.
- (4 marks)

c. State two symptoms that may have led the doctor to suspect that George was suffering from a thyroid hormone deficiency. Give the physiological reasons for each symptom.

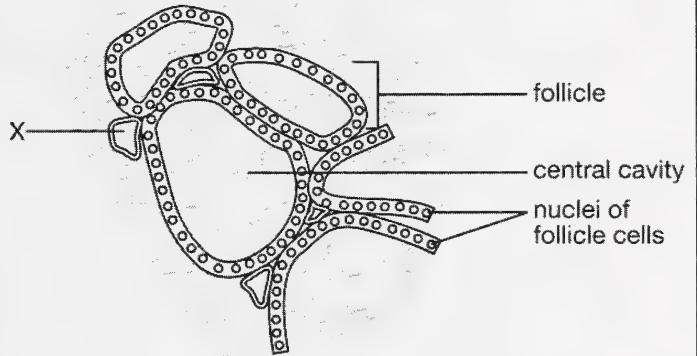
Use this additional information to answer the following questions.

A sample of tissue was taken from George's thyroid gland, and a stained section was prepared for viewing under the microscope. This was compared with a similarly prepared section taken from a healthy human. Drawings of parts of these sections are shown below.

George's Tissue



Healthy Human Tissue



(1 mark)

2. a. Suggest a function for the central cavity of the follicle.

(1 mark)

- b. Identify the tubular structure on the diagram that is labelled X.

(2 marks)

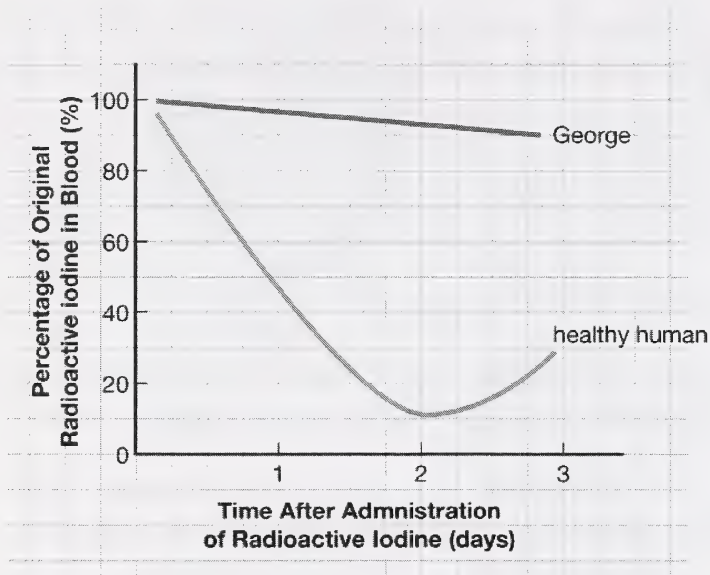
- c. Explain why there should be many such tubular structures in thyroid tissue.

(1 mark)

- d. The doctor hypothesized that George's symptoms could also be the result of a lack of iodine in his diet. Explain why this element is required for healthy thyroid function.

Use this additional information to answer the following questions.

The doctor set up a diagnostic test for George in which he received a low dosage of radioactive iodine compounds. The results of the levels of radioactive iodine in his blood were then compared to the levels of radioactive iodine in the blood of a healthy human. The results are shown in the graph below.



- (3 marks) 3. a. Write the hypothesis the doctor was investigating with this test.

- (1 mark) b. What was the purpose of giving a healthy human radioactive iodine compounds in this experiment?

(2 marks)

- c. Do the results shown in the graph support the hypothesis? Explain your answer.

(1 mark)

- d. Suggest why the graph for the healthy human rose after approximately two days.

(1 mark)

- e. Outline one treatment that might enable George to recover.

MODULE 2: LESSON 5 ASSIGNMENT

This Module 2: Lesson 5 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 Marks) Lesson 5 Assignment—the Pancreas

- (1 mark) 1. Blood samples taken from an individual who had been fasting for 24 h would have which of the following?
- A. high levels of insulin and low levels of glucagon
 - B. high levels of insulin and high levels of glucagon
 - C. low levels of insulin and low levels of glucagon
 - D. low levels of insulin and high levels of glucagon

Use the information below to answer question 2.

Michael Simpson has just been brought into the emergency room of the Royal Alexandra Hospital. He is perspiring profusely and is breathing rapidly and irregularly. His breath smells strongly like nail polish remover (acetone), and his blood sugar tests at 700 mg/mL of blood. Normal range for blood sugar is 75 mg/mL–110 mL of blood.

- (1 mark) 2. Which hormone drug should most likely be administered and why?
- A. insulin because the patient is hyperglycemic
 - B. insulin because the patient is hypoglycemic
 - C. glucagon because the patient is hyperglycemic
 - D. glucagon because the patient is hypoglycemic
- (1 mark) 3. Which one of the following is a function of insulin?
- A. stimulation of cell respiration
 - B. decrease in sugar absorption by body cells
 - C. decrease in conversion of glucose to fat
 - D. increase in glycogen synthesis

Use the following list of hormones to answer question 4.

Which of the following pairs of hormones function antagonistically?

- I insulin
- II calcitonin
- III glucagon
- IV thyroxine
- V parathyroid hormone

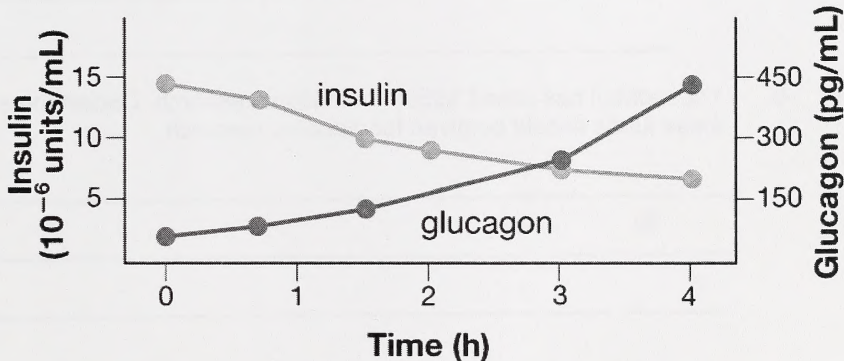
(1 mark)

4. Which of the following pairs of hormones function antagonistically?

- A. I and IV
- B. I and III
- C. II and IV
- D. IV and V

Use the following graph to answer question 5.

The graph shows an individual's insulin and glucagon levels during a 4-hour hike with no break for food.



(2 marks)

5. a. At what point in time does the level of insulin drop? What is the effect on the body?

(2 marks)

- b. At what point in time does the level of glucagon rise? What is the effect on the body?

(2 marks)

- c. How would having a large meal at the 4-h time point affect the individual's levels of insulin and glucagon?

(3 marks)

- d. Hypothesize what this graph would look like if this individual had untreated Type 1 diabetes mellitus.

(3 marks)

6. Your school has raised \$5500 for medical research. Outline three reasons why these funds should be given for diabetes research.

7. Explain the following aspects of diabetes mellitus and its treatment.

(1 mark)

- a. Glucose may be present in the urine of an untreated diabetic.

(1 mark)

- b. A diabetic cannot take insulin orally in pill form; it must be injected.

8. Research shows a strong correlation between people with Type 2 diabetes mellitus and obesity.

(1 mark)

- a. Identify two societal factors that may be contributing to the rise of Type 2 diabetes in Canada.

(1 mark)

- b. Suggest how one of these factors may be addressed.

MODULE 2: LESSON 6 ASSIGNMENT

This Module 2: Lesson 6 Assignment is worth 15 marks.

(15 marks) Lesson 6 Assignment—Bringing It Together

The assignment addresses the focusing question of this lesson:

- How are the nervous and endocrine systems interdependent and how are they different?

Using your notes and answers to the questions in the Self-Check and Try This exercises, construct a Venn diagram to show how the endocrine and nervous systems are different and how they are similar in their maintenance of homeostasis.

You should have at least five points in each of the three areas of the Venn diagram.